The New Ludic City: From hybrid play towards embedded play within urban spaces

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The New Ludic City

From hybrid play towards embedded play within urban spaces

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Introduction

> What's missing in the World of Tomorrow, or its latter-day counterpart in cyberspace, or anytime-anyplace version of ubiquitous computing, is the world itself. Homo Faber has an Achilles' heel; his artifice cuts him off from his nature.
>
> (McCullough 2005)

Visions of future cities from the early 20th century brought us ambitious foresight of flying automobiles, weather-regulated domes and post-apocalyptic dystopias that lacked all kinds of human activity. Even today, thinking about the future seems to focus on urban efficiency by reducing everyday interaction to a world dominated by self-service, driverless cars and communication via touch-screens. Cities have become hybrid spaces (de Souza e Silva 2006) with inhabitants drifting toward a life with their heads in the cloud.

These hybrid spaces that exist in urban areas encompass a virtual framework that enable new forms of game and play (Raessens 2006). Due to the multiple extensions of media infrastructures like mobile technologies and locative media that have been installed largely in the city, the way people play has shifted intensively over the last years. Urban space itself has now become a complex interface, which is a dominant form of human self-organization and orientation. Over the last few years, many academics have written on the subject of hybrid cities and hybrid play. Although the concept of hybridity does recognize the existence of a digital layer within urban spaces, it tends to look upon this digital layer as a separate reality usually accessed by an Internet-enabled phone. This dependency on screens for interaction and play with the digital layer has huge implications the way we play in these hybrid environments. It forces users to focus on the interface (i.e. the screen) instead of the physical environment thereby making play primarily a digital experience. This causes a loss of collective link with space, produced by replacing the conditions of life experience. The most vivid and intense experiences have gone from being developed in a physical and social context to take place in a private virtual environment.

Eliminating the identification of the person with urban space impoverishes social life. If citizens fail to understand public space as an essential element of their life experience, it will increasingly suffer more qualitative degradation. When public space loses its function as an element of citizenship cohesion and identity, it runs the risk of becoming a mere decoration with a total lack of social functionality.

This paper will focus on how to use digital technologies to encourage physical play in urban settings by embedding media within urban space. Embedded in this sense stands for tangible connections between the digital and the physical layer within the urban settings. Therefore, embedded media does not necessarily rely on the mobile phone for representation of the digital space. These embedded media objects lead to new perspectives on using public space in unusual and alternative ways where real and virtual spaces intermingle. By embedding media directly within the physical environment, urban space itself becomes a ludic interface, a playful environment, and an urban playground.

Theory

Before researching how embedded media can encourage physical play in urban settings, I will start with a brief review of the available literature on the subject of play and urbanity in general and hybrid spaces in particular.

I will begin by looking at the concept of game and play. According to Huizinga (1949) play is more than a physiological phenomenon or a psychological reflex. Play goes beyond the confines of purely physical or purely biological activity. In play, there is something "at play" which transcends the immediate needs of life and imparts meaning to the action. Huizinga defines the playground as a magic circle; a temporary world within the ordinary world, dedicated to the performance of an act apart (12). The magic circle of a game is where the game takes place. Playing a game means entering into a magic circle, or perhaps creating one as a game begins.

Caillois (1961) extended this theory of play by differentiating play between paidia and ludus. Play as paidia characterizes itself by diversion, destruction, spontaneity, caprice, turbulence and exuberance. Paidia is human will acting without ethical deliberation. This form of play enhances one's awareness of agency, a free and active force that shapes and is shaped by interaction (Latour 2005). It is often an improvisational escape from routine through which one explores new possibilities of social experiences, and one develops new social forms. Paidia is typical for the play of children, who have no self-conscious about their feelings and actions and surroundings. However according to Mouledoux (1977) adults as well retain an attraction towards undisciplined behaviour and exposure to risk.

Ludus, according to Caillois, is play institutionalized as a game. It follows rules and routines that are purposely contrived to be tedious and arbitrary. One has to master these rules to advance. The pleasure of ludus, therefore, lies in developing and

mastering techniques. There is a psychological satisfaction that comes from discovering solutions within a predefined framework, external to the demands of instrumental function.

In a more recent research on the subject of gamification Deterding et al. (2011) note that the term "gamification" demarcates a distinct group of phenomena, namely the complex of gamefulness, gameful interaction, and gameful design. These phenomena are different from the more established concepts of playfulness, playful interaction, or design for playfulness. Whereas gaming tends to capture playing structured by rules and competitive strife toward goals, playing denotes a free-form, improvisational, expressive recombination of behaviours and meanings.

Academic as well as industry critiques of "gamified" applications (Alfrink 2011, Deterding 2012) emphasize that gamification focuses almost exclusively on design elements for rule-bound and goal-oriented play (i.e., ludus). Whereas open, exploratory, free-form play (i.e., paidia) receives far less attention. To this end, Gaver (2004) introduced the terms "ludic design", "ludic engagement" and "ludic activities". With these terms, he broadly describes "activities motivated by curiosity, exploration and reflection".

Building on this concept of ludicity and in the spirit of Huizinga's Homo Ludens, Raessens et al. (2006) write about the ludification of today's culture. Raessens looks into the ways in which computer games and other digital technologies such as mobile phones and the Internet stimulate playful goals and in these technologies facilitate the construction of playful identities.

According to Fuchs (2012) ludification is the infiltration of society with play-related aspects, i.e. methods, metaphors and attributes of play. Ludic interfaces shift the focus from rules and roles to processes of the deconstruction of rules, roles, and socio-historical settings. Fuchs questions the ownership of ludicity, claiming it is neither a property of the game nor is it owned by the player or by the game-designer. Instead, it is the interface that is the ultimate ludic device as it always has a ludic potential being pivotal points between two systems.

Building on these new forms of play, Montola (2009) notes that pervasive games and digital technologies expand the contractual magic circle of play. Montola defines temporal expansion, where the socially constructed game session is interlaced and mixed with ordinary life; spatial expansion, where the socially constructed location of the game is unclear or unlimited; and social expansion, which blurs the boundaries of playership.

Taking a step sideward, looking into the concept of a playful space this paper follows the notion of Henri Lefebvre (1991) that spaces are not given but rather constructed. Spaces reflect economic, and power relations present in each historical time frame and, therefore, express social practices. As social spaces are a product of social practice, they can be constructed by people's movement and by the "use" of this space. Following Lefebvre, spaces are not only social but also playful in a paidiac sense (Caillois 1961). Paidia is intrinsically social in that it emerges from the relationships between people (de Souza e Silva en Sutko 2008).

An early example of urban play is the rise of the flâneur in the late 19th century. The term flâneur was coined by the painter Charles Baudelaire and was later popularized by Walter Benjamin (1999). The flâneur wandered and consumed the city with detracted gaze. He provided a different lens through which to look at and participate in the city. Within the domain of paidia, we can characterize the flâneur as the ultimate ludic character. The flâneur symbolized the new dimensions of mobility within 19th-century modernity. By his mobility, the flâneur reterritorializes the city through a series of playful (spontaneous) actions. He rescripted the city of the late 19th-century and its increasing commodification into a game of modernity in which he both participates and observes.

The late 19th-century urban spaces have now developed into hybrid spaces (de Souza e Silva 2006). These are mobile spaces, created by the constant movement of users who carry portable devices continuously connected to the Internet, and to other users. The transformation of urban space into hybrid space has led Robert Luke (2006) to extend the term flâneur into its postmodern counterpart of the phoneur who interacts with the outside world through a mobile phone. In Luke's view, the phoneur is a vehicle for m-commerce and surveillance. Luke paints a dystopian picture of the phoneur as a consumer, unable to break free of a capitalist interpellation. However, it is through the use of its mobile phone and mobile gaming that the phoneur shifts away from the flâneur's vision and distanced participation in the spectacle, and instead actively participates in shaping urban space. Within the realm of mobile gaming, the phoneur can decenter the power relations through the merging of playful actions and urban spaces.

Sheller and Urry (2006) suggest that historically, travel was separate from the activities they led to, which means that people would go from place to place, with the goal of getting somewhere. The space traversed was often ignored. Within this logic, urban spaces were mostly used as circulation spaces, where one constantly keeps

moving, with the goal to arrive at specific locations. Space in between lacked meaning. In an attempt to restore meaning to the spaces of circulation of the city, Situationist theorist Guy Débord (1958) developed a *dérive* as a technique to wander through urban spaces. In a *dérive*, one or more persons during a certain period drop their usual motives for movement and action, their relations, leisure activities, and work and let themselves be drawn to the attractions of the terrain and the encounters they find there.

Libero Andreotti (2002) points out that a *dérive* mixes playful and every day "serious" space. Thus, it radicalizes Huizinga's theory of play because it abolishes any distinction between play and seriousness, or between art and everyday life.

As a modern-day version of Débord's *dérive*, I propose the term *intégré* (digital embedded drift). In an *intégré*, one or more persons during a certain period drop their usual motives for movement and action, their work, their relations, and leisure activities and allow themselves to be drawn to or are invited by an encounter with a digital embedded attraction within the physical terrain.

Finally, there is some interesting and relevant literature that uses a phenomenological approach to study technology. This approach can be useful for studying technology as it describes a "lived experience" when using technology. These phenomenological viewpoints provide an alternative method for researching technology and society.

Heidegger (1967) held that we understand the world in terms of what we can do with what we find in it. According to Merleau-Ponty (1962) the body is the vehicle by which we come to have a world; it is the first of all cultural objects and the one by which all others exist. J.J. Gibson (1979) extended these understandings to a focus on interaction. Gibson laid a foundation for understanding human-environment interactions. This concept of affordance interprets the world as an offering of perceptible structures of possible actions, which are grasped through engaged and not necessarily deliberative action. Because playfulness like the dérive in urban settings is often spontaneous people don't have time to learn the rules. Play as paidia lends itself better for embedded play as no rules apply. Participants are not bound by the limits of ludus as they drift between the physical and digital realm. Embedded digital objects within urban space, therefore, can afford paidiac, intrinsically driven, forms of play.

Method & Analysis Framework

Because of near ubiquity of the mobile phone these devices have become very popular to unlock the powerful and playful potential of the hybrid reality described by de Souza e Silva and Sutko (2008). In this paper I will therefore refer to this form of play as hybrid play. The problem with hybrid play is that it shifts the focus of the play, game and social environment toward the digital layer and the artifice (i.e. screen interactions). This makes the playground less open as only those who use the device can play. It also shifts the attention of players towards the screen making the less aware of their physical environment. The advantage of using devices lays partly in the fact that the playground can be controlled, personalized and learned through its interface and programming. Mobile devices like the phone are therefore ideal for play as Ludus (Caillois 1961).

In this paper, I will focus on how digital technologies can encourage physical play in urban settings by embedding media within urban space. I am interested in how embedded technologies can draw people toward spontaneous physical play within urban settings. By embedding media directly within the physical environment, urban space itself becomes a ludic interface, a playful environment, and an urban playground that is accessible by any passer-by. Unlike hybrid play, the physical and social environments are affected and shaped by the player. As social spaces are a product of social practice, they can be constructed by people's movement and by the "use" of this space (Lefebvre, The production of space 1991).

Following the technique of the dérive (Débord 1958) and its modern-day counterpart the intégré in which people let themselves be drawn to the digital embedded attractions of the terrain and the encounters they find there, I will do a comparative textual analysis of three cases of embedded playful media in the urban terrain. Because of the spontaneous character of the intégré my focus will be on the paidia-aspects of play and therefore also on the affordances of the objects in which these media have been embedded. I will look at the physical attributes that tend to characterize playful settings defined by Quinton Stevens (2012): closeness, looseness, and variety.

Closeness emphasizes materiality and the touching of the environment. It is about encounters with the environment on a small scale and in different spatial relationships to the body through climbing over, or moving through or underneath or even being aware of the slope of the ground. The physical characteristics of the setting up close are what Gibson (1979) calls environmental affordances. Children discover

affordances for play everywhere within the environment. Adults are often also aware of these affordances, but they are more inhibited about taking advantage of them, about getting close and taking a risk.

Looseness is about the malleability and the movability of objects and materials within the environment enhance comfort, choice, and control. Sand and water, for instance, are messy, disorderly unfixed natural materials that encourage playful use. Here we might consider the ways that we can play with all the other (digital) stuff that makes up the built environment of the city.

Variety looks at the multiplicity of elements within the environment and the options for using them. Whether we are talking about a myriad of laneways that form the pedestrian space of the city, the variety of street furniture or the repetition of physical elements of different heights or lengths. Variety also means choice and comfort and the opportunities for people to test themselves in a measurable way, to take a risk but not too much of a risk.

The psychologist Josefa Nina Lieberman (1977) has done extensive research into what it means to exhibit playful behaviour. She postulates five dimensions of play, plotted in a pentagonal model, where each corner represents one of these dimensions. This model can be effectively used to analyse playful behaviour.

In her theory, she talks about three forms of spontaneity, which are the driving force of the paidiac play. Cognitive spontaneity being the fuel of imagination, it is needed for 'playing pretend' or solving riddles. Physical spontaneity comes into play in dancing crazy or rough-and-tumble play. Finally social spontaneity is apparent in play between people and social interaction. Other drivers of paidiac play are a 'sense of humour' as it can make you laugh-out-loud and, last but not least, a 'manifestation of joy'. These dimensions give shape to a basic framework for understanding ludic activities. I will use this framework to reverse-engineer playful behaviour in my three case studies.

The case studies I will discuss in this paper are: "Piano Stairs" by The Fun Theory (2009), "Marbles" by Studio Roosegaarde (2012) and "21 Swings" by Mouna Andraos and Melissa Mongiat (2011). I have chosen to analyse these particular projects because of all three were designed with an implicit intention to change people's relation to the urban environment.

Analysis & Findings

Piano Stairs

Piano Stairs is an interactive, playful musical stairway installation created into an underground station of Stockholm. The Piano Stairs were part of an initiative called "The fun theory" with the main objective to "change people's behaviour for the better by making it playful."

The Piano Stairs are situated next to the escalator of the main exit in Stockholm's Odenplan subway station. The goal of the project was to change people's behaviour of taking the escalator and take the stairs instead. To achieve this, the designers took the affordances (Gibson 1979) of black and white piano keys and mapped these affordances on the regular 24 steps of the staircase. Each step matches a keystroke that plays when pressure is applied to the step. The sounds of the Piano Stairs are a series of ascending and descending scales performed by individuals walking up and down the steps. Active participants, however, can collaborate in delivering more complex tunes – and enjoy an aerobic workout at the same time.

Looking at the physical attributes that characterize playful settings the Piano Stairs tend to shift focus from the escalator towards the regular staircase. In this case, there is a strong relation to the concept of closeness as it emphasizes the materiality and touching of the environment. By changing the perception of the affordance of a staircase toward the visual and auditive affordances of a piano, the staircase becomes an object of play. The intention of the project is to make people aware of the variety of choice they have in the environment. It gives people the opportunity to play the piano and to test their skills. It turns the public space into a performative space (Kozel 2007) and, therefore, allows people to take a risk. Despite the physical constraints of the staircase, it becomes loose digitally; in a sense that one is intrinsically challenged to play a tune thus use the staircase in a nonlinear way.

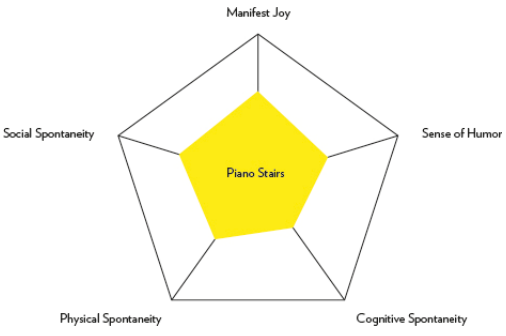

Figure 1

The Piano Stairs have been copied many times in different urban settings. The problem with the Odenplan subway setting is the context of the staircase. A subway station, for most people, is a place of transit (Sheller en Urry 2006), with many people rushing in and out. Most people do not have or take the time to play within this rushed context. In a busy and

important transit zone, the play setting seems to call for impractical congestion and thus annoyance with the none-players. This application of Piano Stairs does not fully allow for active play since non-participants constantly tread the magic circle (Huizinga 1949). Also the Piano Stairs still require skills as for active play participants must know how to play the piano.

When mapping the Piano Stairs onto the dimensions of play defined by Lieberman (image 1) it evenly touches the five aspects of play. There is a potential for a bigger manifestation of joy and social spontaneity when applied to a more open environment where play does not 'get in the way' of others.

Marbles

Marbles, by Daan Roosegaarde, are large glowing shapes that interact with people through sound, light and colour. Marbles are intended transform the landscape into an interactive, playful meeting place of light. During daytime, the marbles look like scattered pieces of rock, in the evening, however, turn the stones into shapes with coloured LED light and sound respond to touch people. Marbles are a permanent artwork commissioned by Ymere at the C. van Eesterenplein in Almere, the Netherlands. It was intended to turn a 'normal' town square into a 21st-century meeting place.

All Marbles vary in shapes and sizes. Every Marble contains LEDs, ambient sounds and smart sensors that respond to human touch and nearness, changing their mood from 'bored' to 'excited'. The Marbles can multiply these interactions between themselves, communicating with each other thus transforming the landscape into an interactive playground of light and sound. This project ascribes agency to both environment and participant (Latour 2005).

In the case of Marbles, the elements of closeness and variety play a key role in the playful setting. The Marbles actively use the physical closeness of people to draw them into their magic circle (Huizinga 1949, Montola, Stenros en Waern 2009). The closer one gets, the more aroused the Marble seems to get, causing a chain reaction of excitement along the other marbles. The materiality and shape of the objects afford climbing onto and jumping off the Marble (Gibson 1979). The placement of the Marbles in a boring urban setting (i.e. a concrete square) also offers variety thereby a warm contrast in the environment. The Marbles, like the piano stairs, are fixed objects. They are malleable, however, in a digital sense. They are digitally loose as they allow

people to change the environmental setting (Lefebvre, The production of space 1991) through colour and sound.

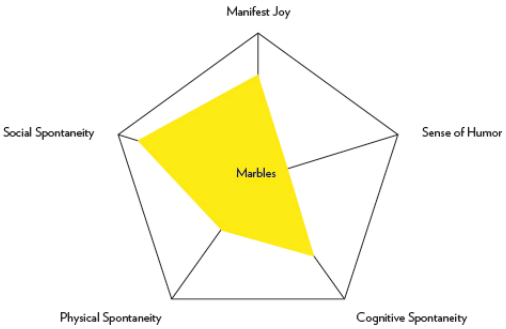

Figure 2

Marbles draws people into the magic circle. It aims to bring people together. Mapping Marbles onto the dimensions of play (figure 2) shows it leans heavily on the aspects of social and cognitive spontaneity, bringing people together in play and in figuring out how the marbles react. Moreover, there is a clear manifestation of joy as people are delighted by an aesthetically pleasing element within an otherwise gloomy environment. It pays a lot less attention to humour and physical spontaneity.

21 swings

21 Swings, by Mouna Andraos & Melissa Mongiat, is a project where swings are placed in the city's entertainment district, Quartier des Spectacles of Montreal. The Promenade des Artistes in Montreal's entertainment district separates a major music venue complex and a science faculty. The objective of 21 Swings was to foster new visit rituals to this piece of land. Each swing acts as a musical instrument. When people swing, pre-recorded sounds from pianos and other instruments fill the air. When all swings are used together, they compose a musical piece in which certain melodies emerge only through cooperation. This cooperation does not come from an individual's decision. Instead, it emerges from interaction where the behaviour of each participant depends on the decisions of the rest of the group. This instinctive way of creating music by swinging stimulates people to play and to experiment (Caillois 1961). Besides it leads people to become aware of each other's experience, to converse and exchange.

The swings interface relates to closeness as a physical dimension of play. Through their affordance swings naturally attract people and people immediately know what to do. The swings create a sense of nostalgia, throwing people back to their childhood (Caillois 1961). Moreover, the choreography of a line of colourful swings in constant motion lit from underneath at night creates a powerful invitation. Taking swings out of their closed playground environment and placing the within a public space creates a distinct variety in the urban landscape. The repetition of this disturbing

physical element 21 times, however, provides comfort for using as it connects participants to one another. The digital malleability of 21 Swings provides people with a sense of ownership of public space (Lefebvre, The production of space 1991) through the music they create. Therefore, despite their physically fixed properties 21 Swings can be considered loose in a digital sense.

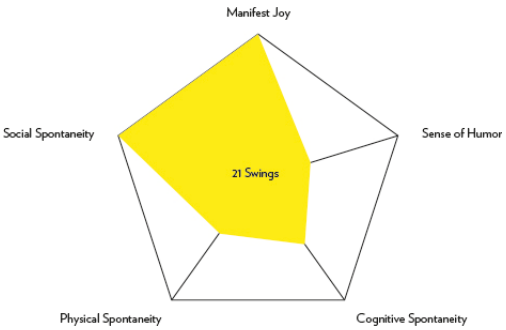

Figure 3

Mapping 21 Swings on the dimensions of playfulness (figure 3) there is a strong manifestation of joy as it taps into the paidiac experiences of childhood (Mouledoux 1977). There is also a strong social spontaneity dimension in this case study. It brings people together in play. This has a cognitive spontaneity dimension as well since participants have to figure out the rhythms of the swings to tune the music.

Conclusion

In the introduction of this paper, I have pointed out that many playful experiences have gone from being developed in a physical and social context to take place in a private virtual environment. This causes a loss of collective link with space, produced by replacing the conditions of life experience. To this end, following Guy Débord's *dérive*, I have coined the term *intégré* to address spontaneous encounters with digitally embedded attractions within the physical terrain.

In this paper, I focused on how embedded media can encourage physical play in urban space. I have analysed three relevant case studies in which embedded media objects encourage physical play according to the characteristics of playful settings (Stevens 2012) and the dimensions of playful behaviour (Lieberman 1977).

Looking at the characteristics of playful settings first it can be concluded that the traditional characteristics can be translated into playful digital settings. The case studies point out that the aspect of closeness is important for the *intégré* since it relies on the materiality and touching of the environment. All case studies make use of embodied interactions that are communicated through the objects affordances. These affordances make the playful settings instinctive and spontaneous and, therefore, paidiac. Besides closeness, the *intégré* also makes use of the fact that the environment can be digitally malleable. Adding a digital loose character to physically static objects provides the participant with a powerful tool of control over the environment. Finally,

all case studies offer a choice of the level of participation. In this sense, the *intégré* brings variety in the environment.

The case studies also were mapped to the dimensions of playful behaviour. This short analysis shows that when technology taps latent predispositions it does not require arbitrary instruction. Approaching play in paidiac terms allows for direct, spontaneous play and ludic engagement motivated by curiosity, exploration and reflection (Gaver, et al. 2004). Following Merleau-Ponty's (1962) notion that our body is the vehicle by which we come to have a world, it is not surprising that all case studies rely on some form of embodied interaction. This embodiment can also be noticed in Lieberman's physical spontaneity as a key dimension of playful behaviour. Both the Marbles and 21 Swings case study make clever use of the social and cognitive spontaneity dimensions by letting users figure out together how music is created. It deskills participants in making music leaving it to the ludic interface (Fuchs 2012) of the installation. The manifestation of joy seems a compulsory dimension of the *intégré* that is seen in all case studies. The dimension of humour seems less relevant in my case studies and is partially included in the manifestation of joy. I would propose it to be replaced with a dimension of aesthetics that is very relevant for Marbles and 21 Swings.

I endorse Raessens (2006), and Andreotti's (2002) claim that Huizinga's notion of technology and play being opposed is no longer valid. I have pointed out that technology now affords play, as technology is embedded within our environment. Further, I point to the importance of the *intégré* as a way of extending people's control over their physical environment and that, following Lefebvre (2004) and Merleau-Ponty (1962) the body, not the mind, is the vehicle by which we experience, control and shape that world. Therefore, I hold that the embodied interaction present within embedded play is very relevant since it touches and manipulates the physical environment far more directly than hybrid play. As this paper offers limited space, I have only touched briefly upon how embedded media can encourage physical play. I think this form of play offers a valuable addition to the academic discourse and that it lends itself to further exploration.

Bibliography

Alfrink, K. "New games for new cities." *Presentation, FutureEverything*. Manchester, UK: http://goo.gl/6Wfx4, 2011.

Andreotti, L. “Guy Debord and the Situationist International .” In *Architecture and play* , by T. McDonough, 214-237. Cambridge, MA: MIT Press, 2002.

Benjamin, Walter. *The arcades project*. Edited by R. Tiedmann. Translated by H. Eiland and K. McLaughlin . Cambridge, MA: Harvard University Press, 1999.

Caillois, R. *Man, Play and Games*. New York: Free Press of Glencoe, 1961.

Daily tous les jours. *21 Balançoires*. 2011. http://www.dailytouslesjours.com/project/21-balancoires/ (accessed 10 26, 2015).

de Souza e Silva, A. “From cyber to hybrid: mobile technologies as interfaces of hybrid spaces .” *Space & Culture* 9, no. 3 (2006): 261-278.

de Souza e Silva, A., and D.M. Sutko. “Playing life and living play: How hybrid reality games reframe space, play, and the ordinary. .” *Critical Studies in Media Communication* 25 (2008): 447-465.

Débord, G. “Theory of the Dérive.” *Internationale Situationniste*, no. 2 (1958).

Deterding, S. “Playful Technologies.” Edited by C. Wiedemann and S. Zehle. *Depletion Design. A glossary of Network Technologies* (Institute of Network Cultures) 8 (2012): 121-126.

Deterding, S., D. Dixon, R. Khalled, and L. Nacke. “From game design elements to gamefulness:defining gamification.” *Mindtrek ’11*. New York: ACM, 2011. 9-15.

Fuchs, Mathias. *Ludic interfaces. Driver and product of gamification*. 2012. goo.gl/NlupMy (accessed 10 20, 2015).

Gaver, W.W., et al. “The drift table: Designing for ludic engagement.” *CHI EA ’04*. ACM Press, 2004. 885-900.

Gibson, J.J. *The ecological approach to visual perception*. Boston: Houghton Mifflin, 1979.

Heidegger, M. *Being and Time*. Hoboken: Blackwell, 1967.

Huizinga, J. *Homo Ludens: A Study of the Play-Element in Culture* . Abingdon: Routledge, 1949.

Kozel, Susan. *Closer : performance, technologies, phenomenology*. Cambridge, MA: MIT Press, 2007.

Latour, B. *Reassembling the Social: An Introduction to Actor-Network Theory*. Oxford: Oxford University Press, 2005.

Lefebvre, H. *Rhythmanalysis: Space, Time and Everyday Life*. Translated by S Elden and G Moore. London: Continuum, 2004.

—. *The production of space* . Malden, MA: Blackwell, 1991.

Lieberman, J.N. *Playfulness: Its Relationship to Imagination and Creativity* . Waltham, MA: Academic Press, 1977.

Luke, R. "The phoneur: Mobile commerce and the digital pedagogies of the wireless web." *Communities of difference: Culture, language, technology* (Palgrave MacMillan), 2006: 185-204.

McCullough, Malcom. *Digital Ground; Architecture, Pervasive Computing and Environmental Knowing*. Cambridge, MA: MIT Press, 2005.

Merleau-Ponty, M. *Phenomenology of Perception* . Translated by C Smith. London: Routledge and Kegan Paul , 1962.

Montola, M., J. Stenros, and A. Waern. *Pervasive Games: Theory and Design. Experiences on the boundary Between Life and Play*. Amsterdam: Morgan Kaufman, 2009.

Mouledoux, E. “Theoretical Considerations and a Method for the Study of Play.” Edited by D. Lancy and B.A. Tindall. *The Study of Play: Problems and Prospects* (Leisure Press), 1977.

Raessens, J. “Playful Identities, or the ludification of culture.” *Games and Culture* 1, no. 1 (January 2006): 52-57.

Sheller, M., and J. Urry. *Mobile Technologies of the City*. London: Routledge, 2006.

Stevens, Q. “The How and Where of Play.” *Invited keynote, seminar The Ludic City: urban practices through a playful lens*. Brussels: Free University of Brussels, 2012.

Studio Roosegaarde. *Marbles*. 2012. https://www.studioroosegaarde.net/project/marbles/ (accessed 10 26, 2015).

The Fun Theory. *The Tun Theory*. 22 09 2009. http://www.thefuntheory.com/piano-staircase (accessed 10 26, 2015).